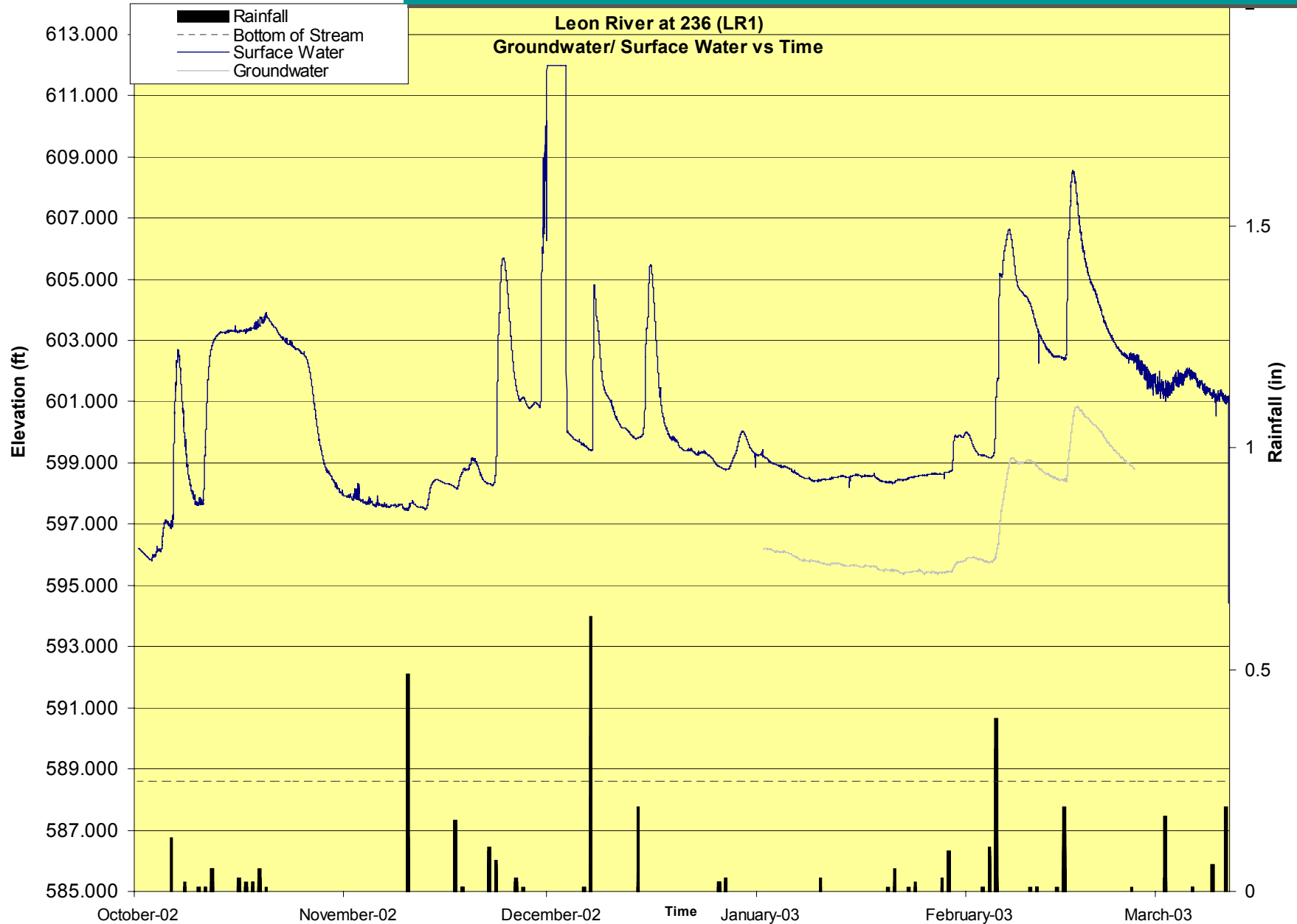


Surface Water levels, Groundwater levels and Rainfall Relationships



Lake Belton ADCP Study

Objective:

To better understand the
flow patterns within Lake
Belton.

Activities completed:

Spring 2003 event

Activities to be conducted:

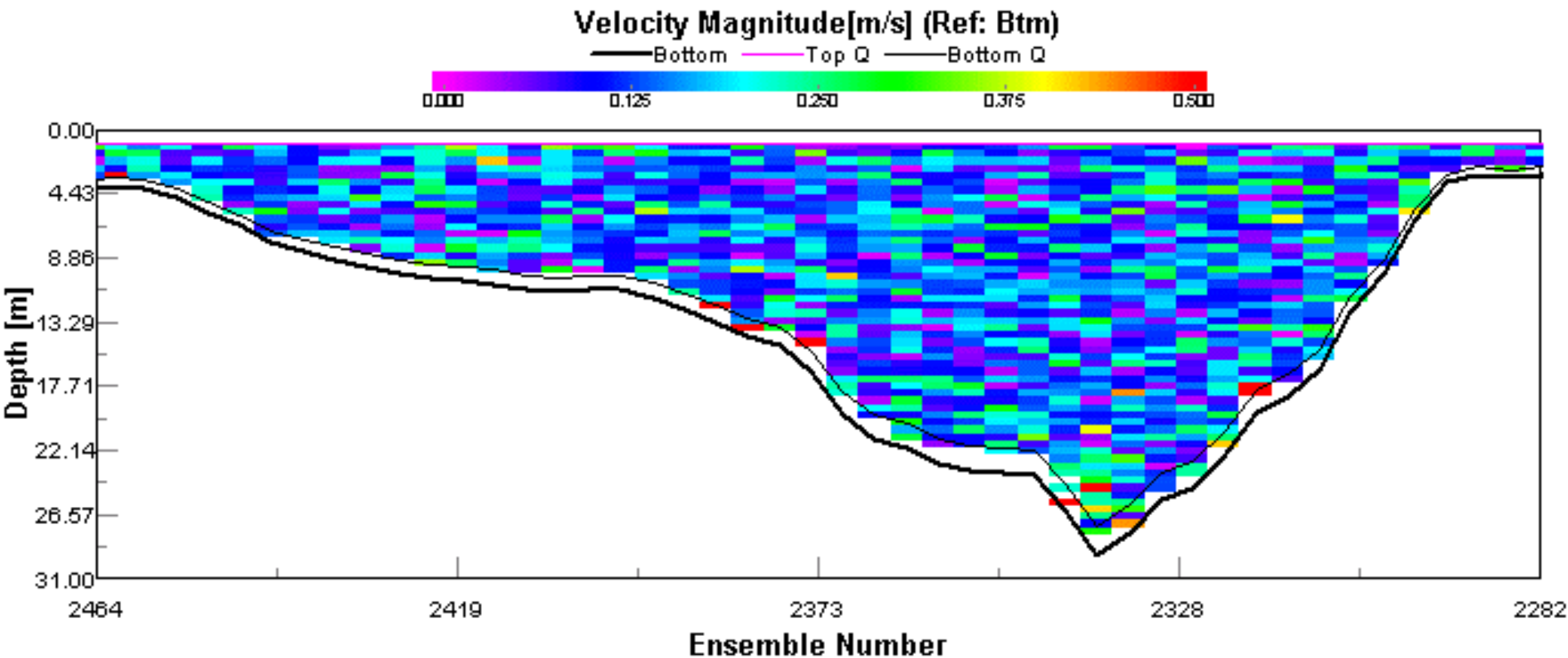
Summer 2003 event

Fall 2003 event

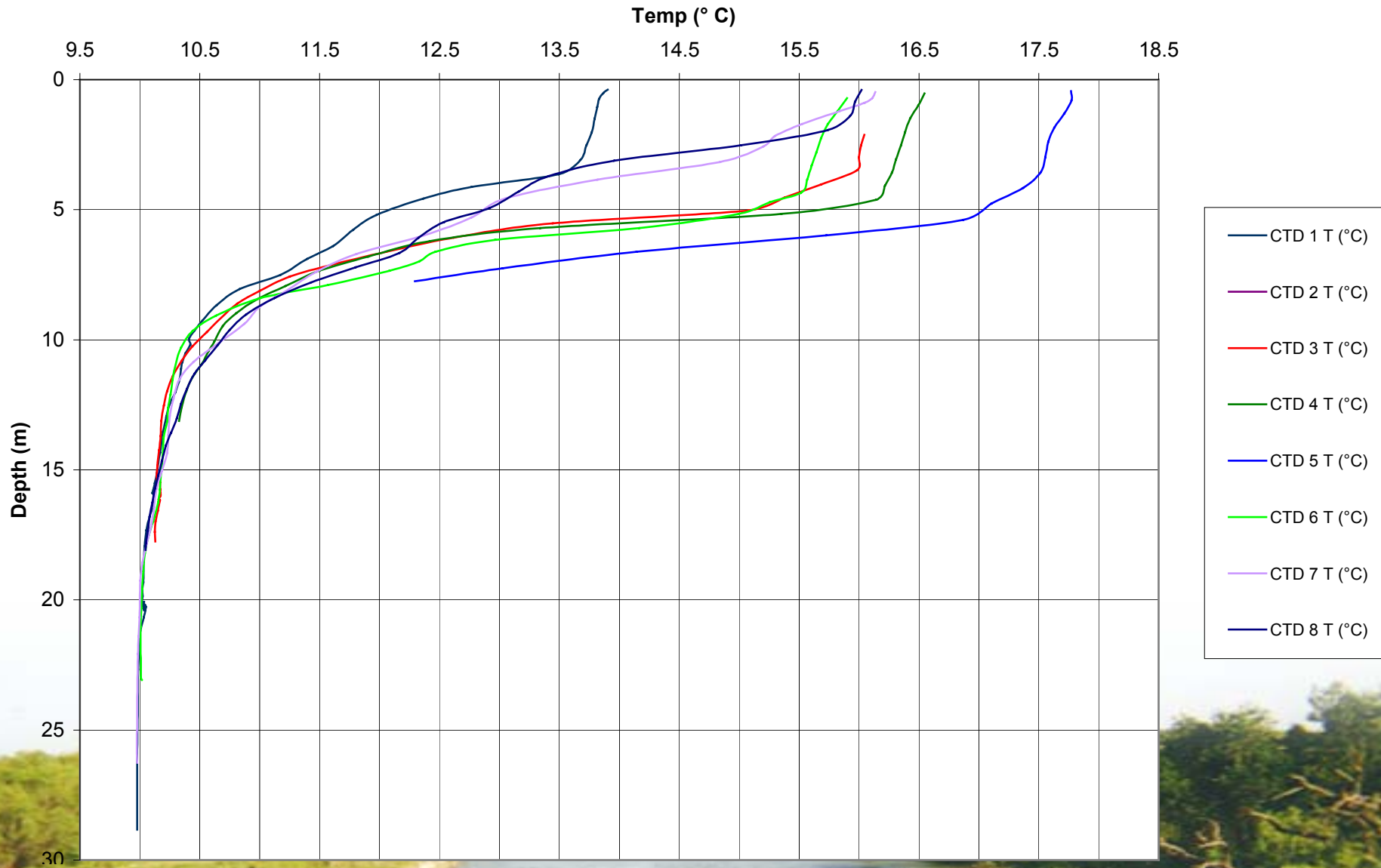
Winter 2003 event



Transect Cross Section and Flow Patterns



Temperature Profile in Lake Belton



Geographic Information System

Allows for the integration of the following information and data:

- **Monitoring wells**
- **Surface water sample locations**
- **Analytical data**
- **Selected watershed features**
- **Topography**

Demonstrations

- **Sampling Stations and Wells**
- **Lake Belton ADCP Study**

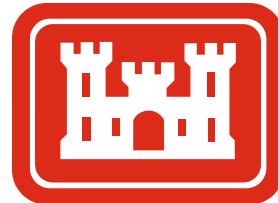
Benefits:

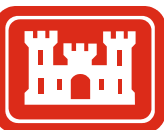
- **Integrates the Navy's, stakeholder's and other information**
- **Used as analytical tool in the fate and transport analysis**



Conclusion

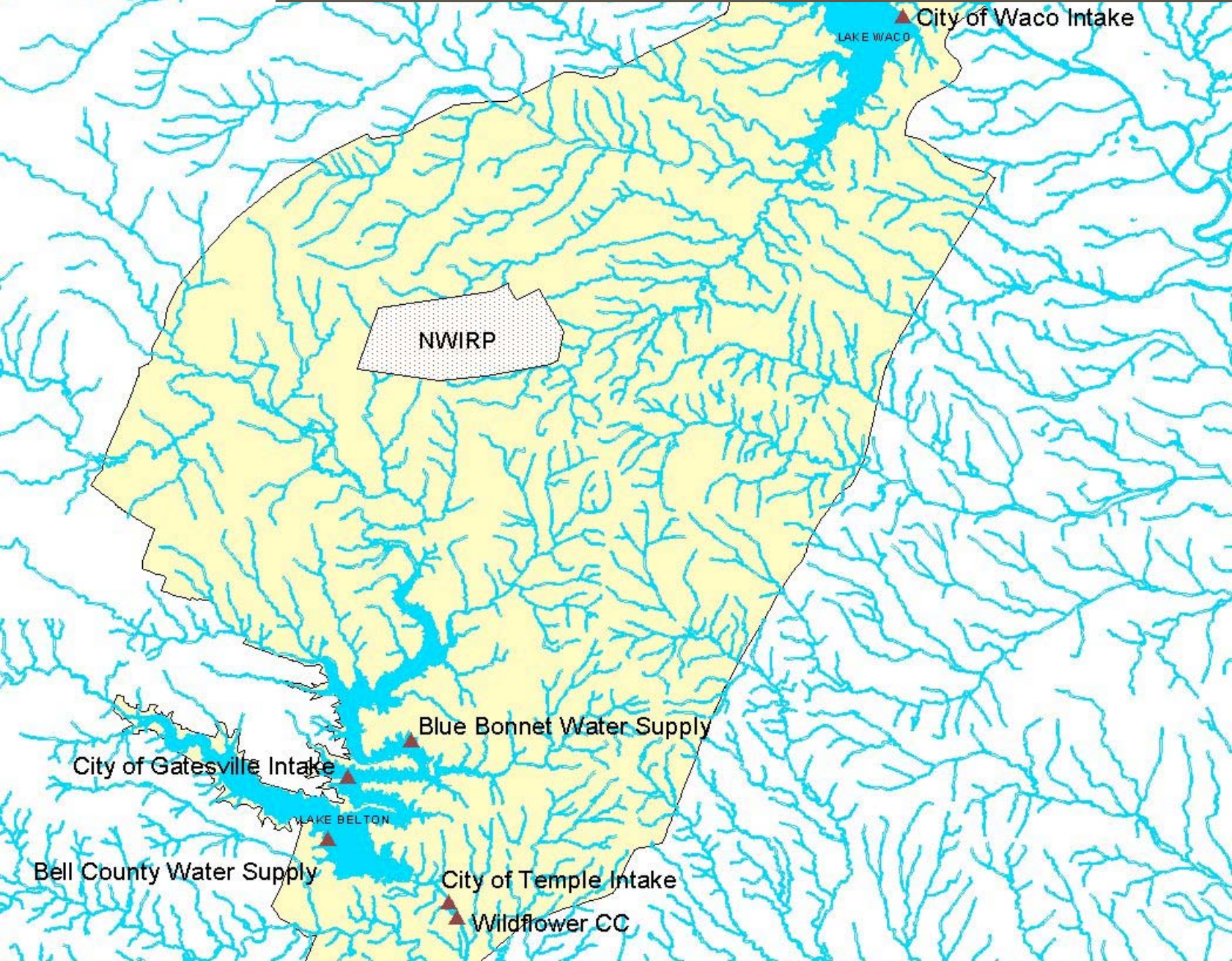
Brian J. Condike
Project Manager
US Army Corps of Engineers
Fort Worth District

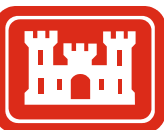




US Army Co
of Engineers
Fort Worth Distri

Intake Sampling Locations





Intake Sampling Results

**US Army Corps
of Engineers
Fort Worth District**

LAKE BELTON INTAKE SAMPLING RESULTS (Conducted by BRA)

January 2003	ND
February 2003	No sampling conducted
March 2003	ND

LAKE WACO INTAKE SAMPLING RESULTS (Conducted by City of Waco)

January 2003	ND
February 2003	ND
March 2003	ND



Remaining Work to be Accomplished

- **Complete field investigations to gain needed information.**
- **Geographic Information System (GIS) database.**
- **Ecological and toxicological assessment of study area.**
- **Complete a comprehensive evaluation of the potential threat to human and environmental health.**
- **Prepare final project report**



Preliminary Results

Perchlorate:

- Varies in surface water with location, season, and rainfall
- Is persistent in sediment
- Is found in various plant species
- Is found in small mammals and birds
- Is not affecting amphibian metamorphosis
- Is affecting fish thyroid tissues
- Can affect frog reproduction (male/ female ratio)



Preliminary Results

- Gaining and losing streams have been identified.
- Preferential flow patterns have been identified in Lake Belton during ADCP spring study.
- Perchlorate concentrations dilute significantly as they travel downstream from NWIRP.
- All samples collected from the Leon River, Middle Bosque and Cowhouse creek are below detection levels.
- All intake sampling performed by the study team have been below detection limits.



Conclusion

Questions?

